

Appl. No. 10/050,347

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REMARKS

Claim 29 is amended. Claim 32 is cancelled. Claims 29-31 and 33-40 are pending in the application.

Claims 29-40 stand rejected as being either anticipated by or obvious relative to Holloway (U.S. Patent No. 6,040,249) or relative to Holloway in view of Millman "Microelectronics". The Examiner is reminded by direction to MPEP § 2131 that anticipation requires each and every element of a claim to be disclosed in a single prior art reference. The Examiner is reminded by direction to MPEP § 2143 that a proper obviousness rejection has the following three requirements: 1) there must be some suggestion or motivation to modify or combine reference teachings; 2) there must be a reasonable expectation of success; and 3) the combined references must teach or suggest all of the claim limitations. Claims 29-40 are allowable over Holloway and Millman for at least the reason that the references, individually or as combined, fail to disclose or suggest each and every element in any of those claims.

As amended, independent claim 29 recites exposing a gate oxide layer to activated nitrogen species from a nitrogen-containing plasma to introduce nitrogen into the gate oxide layer and form a nitrogen-enriched region, the nitrogen-enriched region being only in an upper half of the gate oxide layer, the gate oxide layer being maintained at a temperature less than 400°C during the exposing. Claim 29 further recites, after the exposing, thermally annealing the nitrogen within the nitrogen-enriched region to bond at least a majority of the nitrogen to silicon proximate the nitrogen. The amendment to claim 29 incorporates the subject matter of former dependent claim 32 which is appropriately cancelled. The amendment to claim 29 is further supported by the specification at, for

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example, page 5, line 20 through page 7, line 3. Holloway discloses heating a wafer to a temperature of about 650°C and remotely generating free radicals by microwave plasma to convert a gate oxide to an oxynitride. Such disclosure does not teach or suggest the claim 29 recited after exposing two activated nitrogen species with the gate oxide layer being maintained at a temperature of less than 400°C, thermally annealing the nitrogen.

Millman is relied upon as disclosing features of a MOSFET. However, such features do not contribute towards suggesting the claim 29 recited methodology of forming a transistor where the gate oxide layer is maintained at a temperature of less than 400°C during exposing to activated nitrogen species and subsequently thermally annealing the nitrogen within the nitrogen-enriched region to bond at least a majority of the nitrogen to silicon proximate the nitrogen. Accordingly, in combination, Holloway and Millman fail to disclose or suggest the claim 29 recited exposing the gate oxide layer to activated nitrogen while the gate oxide layer is maintained at a temperature of less than 400°C and subsequently thermally annealing. Claim 29 is therefore not rendered obvious by the combination of Holloway and Millman and is allowable over these references.

Dependent claims 30-31 and 33-40 are allowable over the combination of Holloway and Millman for at least the reason that they depend from allowable base claim 29.

For the reasons discussed above, claims 29-31 and 33-40 are allowable. Accordingly applicant respectfully requests formal allowance of such claims in the Examiner's next action.

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Respectfully submitted,

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